AMENDMENTS TO THE SPECIFICATION

Please delete the paragraph beginning on page 1, line 5, and ending on page 1, line 13, and replace with the following paragraph:

This application claims priority from Stanley STEIN *et al.*, "Highly Sensitive and Specific IgM-Capture...," provisional patent filing serial no. 60/242,819 filed 24 Oct. 2000 and Bo QIU ~~QUI~~ *et al.*, which is incorporated by reference in its entirety herein. ~~"Multiple Epitopes Connected By A Carrier," Serial No. 09/_____, filed ___ Oct. 2001. The contents of these, together with Bo QUI, "Studies of Polymers" (unpublished) and~~ The article by Bo QIU *et al.*, "Selection of Continuous Epitope Sequences," 55 Biopolymers 319 (2001) is also ~~are~~ incorporated here by reference.

Please delete the paragraph beginning on page 2, line 1, and ending on page 2, line 15, and replace with the following paragraph:

Thus, our basic idea can be used to make, for example, an immunological test kit. The term "immunological test kit" means a test kit which uses immune (*e.g.*, antibody-epitope or antibody-antigen) interaction to test for the presence or absence of an analyte ~~anlayte~~. Currently-known examples include ELISA, capillary immuno-chromatography and column immuno-chromatography. In making an immunological test kit, it may be desirable to conjugate reporter moiety on the immunologically invisible carrier (*e.g.*, polyethylene glycol). As another example, our basic idea can be used to conjugate several immunologically reactive substances (either several copies of the same substance, or copies of each of several different substances) together using an immunologically invisible carrier, which conjugate can be then used in an immunological test kit.

Please delete the paragraph beginning on page 2, line 16, and ending of page 2, line 28, and replace with the following paragraph:

The immunologically reactive substance(s) can be one or more of the *Borellia burgdorferi* epitope polypeptides we discovered: VQEGVQQEGAQQP-(beta-A)(beta-A[[,4]])C [SEQ ID NO: 1]; EIAAKAIGKKIHQNNG-(beta-A)(beta-A)C [SEQ ID NO: 2]; ISTLIKQKLDGLKNE-(beta-A)(beta-A)C [SEQ ID NO: 3]; PVVAESPKKPE ~~PWAESPKKPE~~-(beta-A) (beta-A)C [SEQ ID NO: 4]; DKKAINLDKAQQKLD-(beta-A)(beta-A)C [SEQ ID NO: 5]; ITKGKSQKSLGD-(beta-A)(beta-A)C [SEQ ID NO: 6]; and GMTFRAQEGAFLTG-(beta-A) (beta-A)C [SEQ ID NO: 7]. Alternatively, one could use as antigen the nucleic acid coding for one or more of these epitopes. Using such an epitope enables one to make an apparatus for isolating anti-*Borellia burgdorferi* antibody (*i.e.*, a Lyme disease test kit), a vaccine, or a therapeutic. Similarly, the nucleic acid sequences coding for these polypeptides may be useful as antigen, or to make large quantity of polypeptide.

Please delete the paragraph beginning on page 3, line 27, and ending on page 3, line 33, and replace with the following paragraph:

Antibodies generally cannot bind to the whole antigen molecule. Rather, a specific antibody binds specifically to one individual epitope on that antigen. The term "immunologically reactive substance" means an epitope, an ~~and~~ antigen or an antibody. To increase the specificity of our assay, we prefer to use not entire antigens, but one or more defined epitopes.

Please delete the paragraph beginning on page 4, line 16, and ending on page 4, line 19, and replace with the following paragraph:

Whole antigen or antibody may be used instead of epitope, to mount to the carrier molecule. If mounting antibody on the carrier, the antibody-carrier complex can be used to trap antigen or epitope analyte in the test ~~teat~~ solution.

Please delete the paragraph beginning on page 10, line 17, and ending on page 10, line 26, and replace with the following paragraph:

Our preferred embodiment of our invention entails four parts: 1) the selection of specific epitopes by epitope mapping; 2) the design and synthesis of a carrier molecule with multiple attachment sites; 3) the preparation of multivalent carrier-peptide conjugates with one or more reporter groups; and 4) the use of the prepared carrier-peptide-reporter conjugates in an immunological assay. Here is how you can use [[of]] our preferred embodiment to make an indirect IgM-capture ELISA effective for the diagnosis of Lyme disease at its earliest state.

Please delete the paragraph beginning on page 13, line 4, and ending on page 13, line 18, and replace with the following paragraph:

The SPOTS membrane must be regenerated after analysis of each serum sample to remove [[I]] bound proteins before storage or regarding-probing. To regenerate the membrane, it was washed with 5x20 mL MilliQ water and then 3x20 mL DMF followed by another 2x20 mL MilliQ water. Then, 20 mL, of regeneration buffer A (485.0 g urea, 10.0 g. SDS and 1 mL 2-mercapteotbanol in 1 L of MilliQ water) was added and the membrane was incubated for 10 minutes at room temperature. The process was repeated twice. Then 20 mL of regeneration buffer B (Mix 400 mL of MilliQ water and 500 mL ethanol, add 100 mL of acetic acid to above solution) was added and the membrane was incubated for 10 minutes at room temperature. The process was repeated twice. Finally, the membrane was washed with 2x20 mL methanol and air-dried. The membrane was stored in a sealed plastic bag in the freezer (-20 °C) until the next analysis.

Please delete the paragraph beginning on page 14, line 6, and ending on page 14, line 14, and replace with the following paragraph:

The coupling procedure was repeated until the desired peptide sequence was obtained. (See Table 1 for the seven synthesized peptides.) When the assembly of the peptide sequence was complete, the N-terminus of all epitope peptides was capped with long chain biotin to serve the two purposes simultaneously. The first purpose is to remove the charge associated with the free amino group of the N-terminus, thus to mimic the real environment in the natural protein sequence. The second purpose is to use the biotin as the detection label for biotin-avidin binding in ELISA.

Please delete the table entitled "Table 1" beginning on page 14, line 16, and ending of page 14, line 19, and replace with the following table:

Table 1
Synthesized Epitopes

Peptide	Sequence	
FLA, AA 211-223	VQEGVQQEGAQQP-(beta-A)(beta-A[[,4]])C [SEQ ID NO: 1]	1639.8
OspC2, AA71-86	EIAAKAIGKKIHQNNG-(beta-A)(beta-A)C [SEQ ID NO: 2]	2274.3
OspC3, AA 104-118	ISTLIKQKLDGLKNE-(beta-A)(beta-A)C [SEQ ID NO: 3]	2282.3
OspC10, AA 198-207	PVVAESPKKPE ~~PWAESPKKPE~~-(beta-A)(beta-A)C [SEQ ID NO: 4]	1762.7
P83-1, AA296-310	DKKAINLDKAQQKLD-(beta-A)(beta-A)C [SEQ ID NO: 5]	2310.3
P83-3, AA431-442	ITKGKSQKSLGD-(beta-A)(beta-A)C [SEQ ID NO: 6]	1843.8
P39, AA129-142	GMTFRAQEGAFLTG-(beta-A)(beta-A)C [SEQ ID NO: 7]	2067.9

Please delete the paragraph beginning on page 20, line 7, and ending on page 20, line 11, and replace with the following paragraph:

The index number of each serum sample was calculated as: Index = Absorbance of individual serum/Cutoff. An index number of 1.0 or above is taken as a [[.]] positive and an index number of 0.8 or below is taken as a negative. Any index number between 0.8 to 1.0 [[1 .0]] is taken as equivocal.